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Agricultural abandonment and re-cultivation during and after the Chechen Wars in the northern Caucasus



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ABSTRACT

Armed conflicts are globally widespread and can strongly influence societies and the environment. However, where and how armed conflicts affect agricultural land-use is not well-understood. The Caucasus is a multi-ethnic region that experienced several conflicts shortly after the collapse of the Soviet Union, most notably the two Chechen Wars, raising the question how agricultural lands were changed. Here, we investigated how the distance to conflicts and conflict intensity, measured as the number of conflicts and the number of casualties, affected agricultural land abandonment and subsequent re-cultivation, by combining social, environmental and economic variables with remotely-sensed maps of agricultural change. We applied logistic and panel regression analyses for both the First Chechen War (1994–1996) and the Second Chechen War (1999–2009) and interacted conflict distance with conflict intensity measures. We found that agricultural lands closer to conflicts were more likely to be abandoned and less likely to be re-cultivated, with stronger effects for the First Chechen War. Conflict intensity was positively correlated with agricultural land abandonment, but the effects differed based on distance to conflicts and the intensity measure. We found little re-cultivation after the wars, despite abundant subsidies, indicating the potentially long-lasting effects of armed conflicts on land-use. Overall, we found a clear relationship between the Chechen Wars and agricultural land abandonment and re-cultivation, illustrating the strong effects of armed conflicts on agriculture.

1. Introduction

Armed conflicts often have tragic humanitarian consequences (Gates et al., 2012; Li and Wen, 2005) and can have far-reaching and long-lasting environmental effects (Dupuy et al., 2017; Nita et al., 2018). Military operations often target the environment (Austin and Bruch, 2000), and entail adverse environmental outcomes such as defoliation, water contamination and air pollution. For instance, the Vietnam War had devastating environmental effects due to the US' defoliation campaign (Westing, 1976). Similarly, the Gulf War (1990–1991) led to the destruction of more than 700 Kuwaiti oil fields and refineries, creating major atmospheric, marine, and coastal contamination (Gerges, 1993; Price et al., 1994). Conversely, armed

conflicts can also benefit the environment. Habitat can be protected when people avoid areas of violence, exemplified by flourishing wildlife in the Demilitarized Zone between North and South Korea (Gaynor et al., 2016; Kim, 1997; Martin and Szuter, 1999). Assessing the diverse environmental outcomes of armed conflicts is therefore important.

One open question is how armed conflicts affect land use, particularly agriculture in the form of agricultural land abandonment or shifts in agricultural production during and after the conflicts (Baumann and Kuemmerle, 2016; Urdal, 2005). Several causal mechanisms through which conflicts affect agricultural land-use decisions are plausible. Armed conflicts can affect agricultural land-use directly through the destruction of agricultural fields and environmental contamination. For example, deliberate cropland destructions to destabilize the opposing

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